

## ABSTRACT

Catalysts and methods for alkane oxydehydrogenation are disclosed. The catalysts of the invention generally comprise (i) nickel or a nickel-containing compound and (ii) at least one or more of titanium (Ti), tantalum (Ta), niobium (Nb), hafnium (Hf), 5 tungsten (W), yttrium (Y), zinc (Zn), zirconium (Zr), or aluminum (Al), or a compound containing one or more of such element(s). In preferred embodiments, the catalyst is a supported catalyst, the alkane is selected from the group consisting of ethane, propane, isobutane, n-butane and ethyl chloride, molecular oxygen is co-fed with the alkane to a reaction zone maintained at a temperature ranging from about 250 °C to about 350 °C, 10 and the ethane is oxidatively dehydrogenated to form the corresponding alkene with an alkane conversion of at least about 10% and an alkene selectivity of at least about 70%.